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THE MALE-FEMALE EARNINGS GAP IN ONTARIO: A SUMMARY

by Morley Gunderson

Number 22

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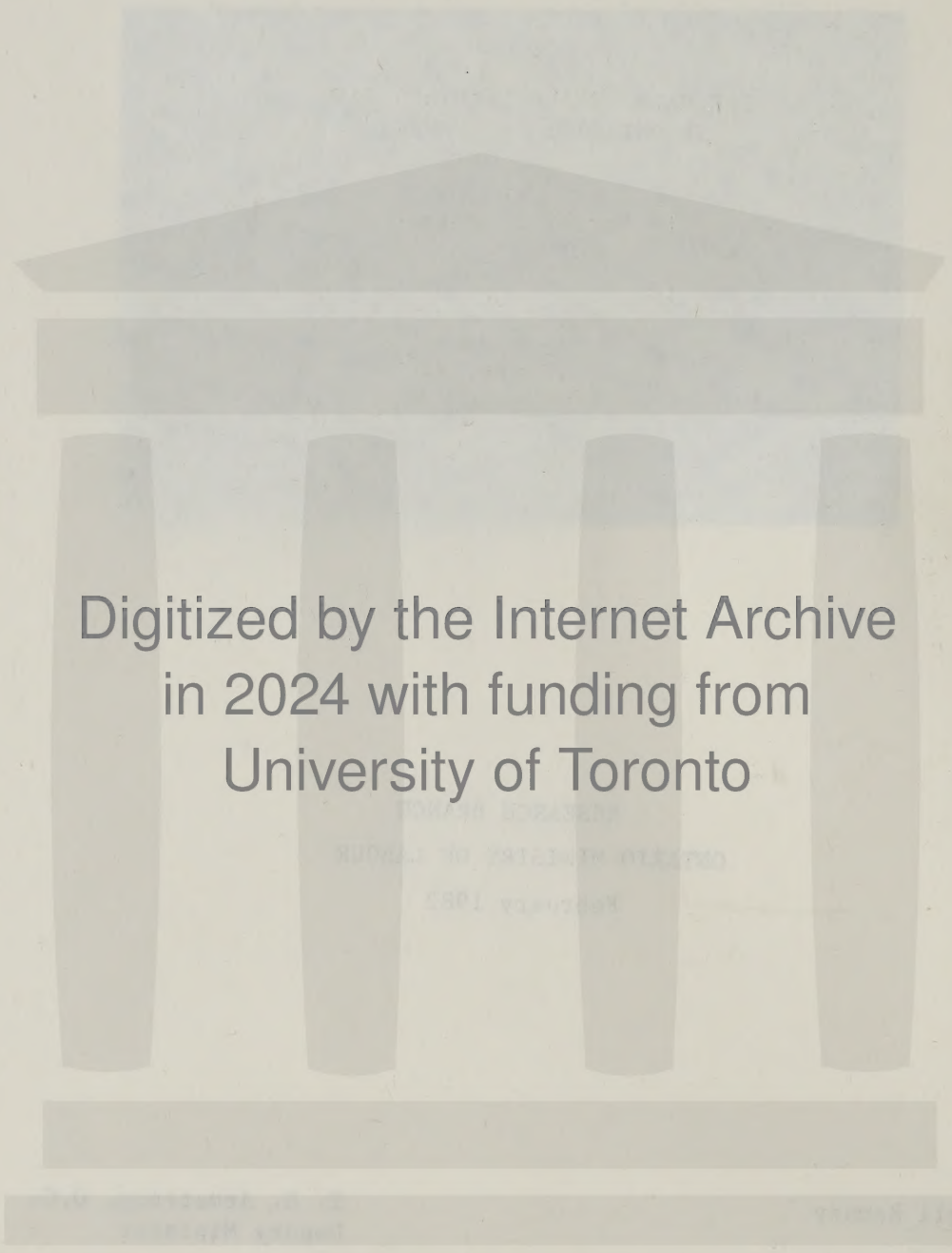

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PREFACE

This report is a summary of a larger report "The Male-Female Earnings Gap: A Current Assessment" prepared in 1980 by the author for, and available from, the Research Branch of the Ontario Ministry of Labour. Both reports reflect the work and the opinion of the author, not necessarily the position of the Research Branch or the Ministry of Labour.

Morley Gunderson

INTRODUCTION

This summary is based on a larger study, "The Male-Female Earnings Gap: A Current Assessment," prepared by the author for the Research Branch of the Ontario Ministry of Labour. The larger report provides a detailed technical analysis of the methodological and statistical techniques and various data sources for measuring the male-female earnings gap, a review of the existing literature, and the results of some econometric analysis as well as some simple data tabulations on male-female earnings.

The purpose of this report is to summarize the most important findings from the larger one, focusing on the highlights and trends, rather than on the technical details. The emphasis is on ascertaining the magnitude of the male-female earnings gap, how it has changed over time, the relative importance of its various determinants, and how it changes when adjustments are made for various productivity related factors. Of major interest is the extent to which discrimination in the labour market underlies the earnings gap. Prior to the presentation of the empirical results, there is a discussion of the various forms of discrimination and some key measurement issues.

FORMS OF DISCRIMINATION

While discrimination can take on a variety of forms, for purposes of labour market policies it is useful to distinguish between discrimination that occurs in the labour market and discrimination that occurs outside of the labour market, although the latter may well affect the success that women achieve in the labour market.

The two major forms of labour market discrimination that influence the male-female earnings gap are wage discrimination (unequal pay for equal work) and occupational segregation (unequal job and promotional opportunities). Equal pay legislation is generally designed to deal with wage discrimination, and fair employment laws are designed to deal with occupational segregation, although both policies can affect both the wages and employment opportunities of females. Of course, other forms of discrimination can occur in the labour market, sexual harassment is but one obvious example.

Discriminatory practices outside the labour market can occur through a number of different channels, two examples being institutional and household discrimination. Institutional discrimination occurs in our various institutions, especially schools, when sex stereotyping influences streaming into programs and career guidance. Discrimination can occur within the household and may also include sex stereotyping and educational streaming, as well as an unequal division of labour and responsibility for household work. While labour market policies do not affect institutional and household discrimination directly, they can have an indirect effect. Flexible working hours and paternity leave policies are obvious examples of labour market

policies that can affect household decisions which in turn can affect labour market behaviour.

Clearly, policies designed to curb discrimination in the labour market cannot be viewed in total isolation from institutional and household discrimination. Nevertheless, in designing policies to curb labour market discrimination, the main focus is on the extent of discrimination as it exists in the labour market. Consequently, in this study institutional and household discrimination and their impact on education, training, work experience, absenteeism and other aspects of labour market behaviour of males and females are taken as given.

From the perspective of labour market policies, it is important to have an understanding of the extent to which labour market discrimination is a factor underlying the overall male-female income gap, and the relative importance of wage discrimination and occupational-industrial segregation as the main components of labour market discrimination. To measure these components, it is necessary to compare male and female earnings after controlling for the effect of differences in productivity related factors. These productivity related factors typically include such characteristics as education, training and experience. When differences in these factors are fully controlled, and when differences in the occupational and industrial distribution of females are also controlled, the remaining gap can be attributed to wage discrimination in the sense of unequal pay for the same measured productivity related factors.

Earnings differences that arise because of differences in the occupational-industrial distribution of males and females are more difficult to label as discriminatory or non-discriminatory because they can reflect "choice" as well as occupational-industrial segregation. What is considered choice in this area, of course, is subject to considerable controversy since female choices may be limited by institutional or household discrimination prior to entering the labour market. Nevertheless, for purposes of labour market policies to combat discrimination in the labour market, to the extent that occupational and industrial segregation reflect unequal employment opportunities for females relative to males, they represent forms of discrimination in the labour market.

SOME MEASUREMENT ISSUES

A variety of statistical techniques have been utilized to quantify the magnitude of labour market discrimination in both of its main dimensions -- wage discrimination and occupational-industrial segregation. The techniques basically involve adjusting the overall male-female earnings gap for differences in productivity related factors. As already noted, differences in these productivity related factors themselves may arise partly from discrimination prior to entering the labour market, notably from within the household and educational institutions. However, such productivity differences are beyond the direct scope of labour market policies and, hence, they are not categorized as reflecting labour market discrimination.

Productivity differences can be controlled for in empirical work in a variety of ways, the two main techniques being sample selection and multiple regression. With sample selection, comparisons are made between the earnings of males and females who are similar (ideally identical) with respect to their net endowments of productivity related factors. Thus comparisons are made between males and females who have the same education, training, experience, occupation, industry, etc., or between males and females in the same narrowly-defined occupation in the same region, assuming that they do the same work whatever their productivity related characteristics. The accuracy of such comparisons, of course, is only as good as the sample selection procedure used to pick similar males and females.

Multiple regression analysis can also be used to control for the effect of differences in productivity related factors. In this technique separate earnings equations are estimated for males and females, where the determinants of earnings (explanatory variables) include the various productivity related factors such as education, training, occupation, industry, etc. Based on the results of these separate earnings equations, the overall average male-female earnings differential can be decomposed into two component parts: one portion attributable to differences in the pay structure (regression coefficients) of males and females for the same productivity related factors, and another portion attributable to differences in the endowments of productivity related factors (explanatory variables). The former portion is conventionally labelled wage discrimination since it reflects unequal pay for the same wage-determining characteristics. The accuracy of this measure, of course, depends on the extent to which differences in the productivity related factors are controlled for in the regression analysis.

For both the sample selection technique and the regression analysis, the resulting portion of the male-female earnings gap attributed to labour market discrimination depends critically on the extent to which one can meaningfully control for the influence of differences in the productivity related factors. Examples of variables for which it is extremely difficult to obtain data include work experience (its quantity, quality and continuity), nature of education (i.e. its relevance to the labour market), and absenteeism. Omission of these factors may bias the results and to the extent that females have less work experience, higher absenteeism and their education is not as labour-market oriented as that of males, then the earnings gap after attempting to allow for productivity factors would reflect more than the influence of labour market discrimination. There are proxy variables that can be used to partially control for differences in these factors; nevertheless, interpretations of the empirical results should keep these differences in mind. It is, in fact, differences in the extent of adjustment for these productivity related differences that accounts for most of the differences in the literature concerning the magnitude of the gap.

The other major source of discrepancy in the measurement of the earning gap between males and females occurs because of the different measures of earnings that are used. Annual or lifetime income measures will yield a larger gap because they not only reflect wage differences but also differences in time worked. To the extent that differences in time worked reflect discrimination then such a produc-

tivity adjusted income gap may be an accurate measure of discrimination. However, from the perspective of policies to curb discrimination in the labour market, measures of the hourly wage gap, or at least measures that control for differences in time worked, are most relevant.

A final source of discrepancy over the measurement of the earning gap occurs because in some instances the absolute gap (male minus female wages) is used, while in others a relative gap is used, the most common being the ratio of female to male wages. The latter controls for differences in the absolute level of earnings, and in that sense is a better measure of changes in the gap over time because it is not distorted by the dramatic changes in the money wage level that has occurred over time, reflecting in part the inflation rate.

Subject to these various measurement problems, empirical analysis can provide estimates of the magnitude of the male-female earnings gap, its determinants, the extent to which it reflects discrimination, and how it has changed over time. Such empirical evidence for Ontario is presented in the next section, followed by the evidence for all Canada and a discussion of experience in other countries. The numerous studies illustrate the problems in measuring the extent of labour market discrimination and how different approaches can lead to different conclusions.

EMPIRICAL EVIDENCE ON MALE-FEMALE EARNINGS GAP IN ONTARIO

Decomposition of Gap Based on Regression Analysis

Some new empirical evidence for Ontario, based on the regression technique discussed previously, is presented in this section. The regression format is exactly the same as that utilized by the author in a previous study [Gunderson, 1979] based on data for all of Canada which permits a comparison of Ontario with all of Canada.

Based on 1971 Census data, average earnings in Ontario were 4,915 dollars for females and 8,246 dollars for males, which implies a gross, unadjusted earnings ratio of .60 (i.e., 4,915/8,246) for full-time, full-year workers. Regression analysis indicates that 1,363 dollars of the gap can be attributed to differences in productivity related characteristics. Therefore, if females had the same productivity related endowments as males, their earnings would be increased by 1,363 dollars yielding productivity adjusted earnings of 6,278 dollars. The net or productivity adjusted female/male earnings ratio, therefore, would be .76 (i.e. 6278/8246) as compared to the gross, unadjusted ratio of .60. This is very close to the .75 ratio found in Gunderson [1976] based on comparisons in narrowly-defined occupations across establishments and suggests that comparing male-female wages within narrowly-defined occupations is a viable alternative way of making rough adjustments for productivity related factors.

These results are consistent with those based on similar methodologies as given in Gunderson [1979] for all Canada, Robb [1978] for urban Ontario, and they are similar to those based on U.S. data [discussed in Robb, 1978, p.352]. All these studies suggest that

by adjusting for productivity related factors included in the regression equations, the ratio of female to male earnings rises from approximately .60 to .76. This leaves a large residual gap that could be attributed to wage discrimination or differences in productivity related factors not controlled for in the regression analysis. To the extent that relevant productivity differences are omitted from the regressions, these will be captured in the wage discrimination residual. Important omitted variables include actual labour market experience (only potential experience was included), and differences in the occupational distribution within the broad occupations included in the regression. If segmentation within broad occupations were controlled for, perhaps by the use of narrowly-defined occupations, then a much smaller portion of the overall earnings gap would be attributed to wage discrimination and a much larger portion attributed to endowment differences, much of which could reflect occupational segregation. In subsequent sections it is shown that, in fact, studies that provide better controls for these omitted variables indicate that the discriminatory portion of the earnings gap is dominated by occupational segregation as opposed to wage discrimination.

Individuals come to the labour market with different endowments of productivity related factors (explanatory variables) such as education, training, etc. A calculation of the contribution of each of these explanatory variables to the overall earnings gap indicates the differences resulting from endowment variations and the possible channels through which wage discrimination occurs. The main sources of the more favourable male endowments of productivity-related factors are longer labour market experience, marital status, and more favourable industrial and occupational distribution. In fact, these four factors account for almost all of the more favourable endowments of males. The occupation variable would be even more prominent if one were also to consider the more favourable distribution of males within broad occupation groups.

The main channels through which wage discrimination may operate are through the substantially higher returns that males receive for the same education, experience and marital status as females. This has been labelled wage discrimination although it highlights the possibility that females receive even lower returns if the education is not labour market oriented, their experience is discontinuous, or their marital status is taken as detrimental to labour market behaviour. The higher returns that males receive for additional education occurs only at low levels of education; for higher levels of education females receive greater economic returns than do males.

Robb's Decomposition for Urban Ontario

As expected, given the similarities of the data and methodology, the empirical results presented in the previous section are similar to the results presented in an earlier study by Robb [1978] for urban Ontario. Robb's study, however, provides additional information. When occupation and industry variables are omitted from the regression (on the grounds that they should not be controlled for because differences in the occupation and industry distribution reflect discrimination), then 75 percent of the earnings gap is attributed to wage plus occupation and industry discrimination.

Robb ran separate regressions for single, never-married females age 30 and over to compare with the all male regressions. The rationale was that single, never-married females 30 and over would be more like males in their labour market experience since such females would be unlikely to have taken, or to expect to take, time out from labour market to engage in household activities. This is an example of using sample selection to obtain more homogeneous groups so as to control for the important variable of work experience.The results indicate that when differences in experience are controlled for in this manner, the portion of the gap attributable to wage discrimination is reduced from 59 to 15 percent, and the portion attributed to wage discrimination plus industrial-occupational segregation falls from 75 to 37 percent. Robb's results, therefore indicate that industrial-occupational segregation is considerably more important than wage discrimination as a determinant of the overall earnings gap.

These results are summarized in Table 1 and reveal that even when experience and other productivity factors are controlled for, labour market discrimination accounts for well over one-third of the male-female earnings gap. This extent of labour market discrimination may be an overestimate to the extent that occupational-industrial segregation is not discriminatory or to the extent that omitted variables bias the result -- a possibility that is minimized since the crucial variable of experience is controlled for in a stringent fashion. On the other hand, the labour market discrimination portion referred to in Table 1 does not reflect discrimination that may exist in the acquisition of productivity related endowments, that is, it does not allow for discrimination that may occur largely outside of the labour market, notably in educational institutions or from within the household itself.

Unfortunately, Robb does not give the actual female and male average earnings to enable the computation of an unadjusted and productivity adjusted earnings ratio. However, some reasonable assumptions and basic data manipulation enable the calculation of approximations to such productivity adjusted ratios as .76 when experience is not controlled for and .94 when experience is controlled for.[1] While the latter ratio clearly illustrates the importance of controlling for labour market experience, it should be regarded as illustrative more than definitive partly because of the way experience was controlled for and partly because it was derived here from some basic data manipulations rather than being directly estimated in the Robb study.

TABLE 1. PORTION OF EARNINGS GAP ATTRIBUTABLE TO VARIOUS FORMS OF LABOUR MARKET DISCRIMINATION, ONTARIO 1971

Form of Discrimination	Experience Factor[a]	
	Not controlled for	Controlled for
Wage discrimination residual	.59	.15
Occupational-industrial segregation[b]	.16	.22
Total labour market discrimination	.75	.37

Source: Extracted from Robb [1978].

Notes: (a) Experience is controlled for by comparing single, never-married females 30 years of age and over with all males.

(b) This component is calculated here as the portion of the the earnings gap attributed to total labour market discrimination (obtained from the personal characteristics regression that excludes occupation and industry) less the portion attributed to wage discrimination. These figures are very close to those obtained by evaluating the endowment differences in occupations and industry and expressing this as a percent of the overall earnings gap.

Occupational Wage Regressions for Ontario

Additional results for Ontario, based on a completely different data set and methodology than utilized in the previous section and in Robb [1978], are available in Gunderson [1975]. The data set is the 1968 and 1969 tapes of the Canada Department of Labour occupational wage survey involving identical, narrowly-defined occupations within the same establishment. Thus, the focus is on wage discrimination as is generally defined in equal pay legislation, pertaining to wage differences within the same establishment for substantially similar work.

The results indicate a proportionate wage advantage, $(w_m-w_f)/w_f$, of .22, which translates into a female to male wage ratio, w_f/w_m, of .82. The remaining gap of .18 may be taken as an upper bound of the extent of wage discrimination within the same establishment. This may be an upper bound to the extent that such factors as absenteeism and turnover are not controlled for by the use of narrowly-defined occupations with identical, detailed job descriptions. However, differences in absenteeism and turnover may be minimal because the use of narrowly-defined occupations within the same establishment controls for differences in absenteeism and turnover that are specific to an occupation and company.

The contention that the gap of .18 is probably an upper limit of the extent of wage discrimination within the same establishment is supported by further calculations. The regression results indicate that in the limited number of occupations with an incentive pay system the proportionate wage advantage is reduced to .14 which implies a female/male wage ratio of .88. To the extent that incentive pay is nondiscriminatory and based purely on results, and to the extent that wages are paid according to marginal productivity, then this suggests that the ratio of female to male marginal productivity within the same establishment would be approximately .88. (The productivity differences themselves, of course, may reflect discrimination in such factors as education or training, as well as the crowding of females into specific jobs and firms.) If the ratio of female to male wages is .82, then this suggests that females earn approximately .93 of what equally productive male earn in the same establishment. (That is $(w_f/w_m)/MPP_f/MPP_m = .82/.88 = .93$ and therefore, $w_f/w_m = .93$ when $MPP_f = MPP_m$, where MPP is the marginal physical product.) This productivity adjusted ratio of .93 implies a discriminatory wage gap of .07 which is slightly over one-third of the unadjusted wage gap of .18 implied by the unadjusted wage ratio of .82. That is, wage discrimination would account for almost 40 percent of the overall wage gap within the same narrowly-defined occupations within the same establishment.

This would suggest a role for equal pay legislation even if it is confined to comparing substantially similar jobs within the same establishment. Nevertheless, that role is rather limited in the sense that its maximum impact would be to reduce the wage gap by approximately 7 percentage points.

The calculations do indicate that wage discrimination appears to prevail even within the same narrowly-defined occupations within the same establishments, and even when allowance is made for the possibility that females in such occupations are on average not as productive as males (perhaps because of pre-labour market discrimination). In essence, even under the most stringent assumptions and adjustment procedures a discriminatory wage gap appears to prevail. However, that gap is considerably smaller than when such adjustments are not made.

The empirical results given in Gunderson [1975] also indicate that unions are highly effective in reducing the male-female wage gap (almost half of the wage gap is closed in unionized establishments). Other things being equal, the wage gap is also smaller in larger establishments and in larger cities. Somewhat surprisingly, the gap did not narrow between 1968 and 1969, the time period during which equal pay provisions were moved from the Human Rights Act to the Employment Standards Act in Ontario. The transferral was designed to provide more effective enforcement since investigations would be carried out on a routine as well as complaint basis, the onus for following through on a complaint rests with the Employment Standards Branch rather than with the person making the complaint, and since those making complaints are protected both by anonymity and by provisions in the Act to prevent reprisals.

Time Pattern Regressions for Ontario

This absence of any effect associated with the transferral of equal pay legislation in Ontario is also confirmed in Gunderson [1976] based on nine narrowly-defined occupations for which there was complete data for the years 1946-1971. A dummy variable shift parameter, to capture the impact of the legislation in the post-legislation years 1969-1971, indicated no significant narrowing of the gap in most occupations, after controlling for the effect of the business cycle and the long run time trend in the gap. Whether this conclusion is generalizable to other occupations or whether it remains true today after there has been a longer time period to adjust to the legislation remains an unanswered question.

The time series study also found other disconcerting evidence pertaining to the time pattern of the male-female wage differential in Ontario. In particular, a linear time trend variable indicated that the relative wage gap was actually widening slightly over the period 1946-1971 in most of the nine occupations. In addition, the gap tended to widen slightly in periods of full employment associated with business cycle prosperity, suggesting that full employment policies cannot be relied upon to close the gap. Again, the extent to which these conclusions based on 1946-1971 data remain true today is not known.

In the nine occupations utilized in the study, the proportionate wage gap, $(w_m-w_f)/w_f$, ranged from .17 to .42, averaging .33; these imply female to male wage ratios ranging from .85 to .70, averaging .75. These are female/male wage ratios in narrowly-defined occupations but across different establishments. This .75 ratio for narrowly-defined occupations across establishments is smaller than the .82 ratio for narrowly-defined occupations within the same establishments as found in Gunderson [1975], indicating that women are also disproportionately employed in low wage establishments in Ontario. In fact this .07 increase in the ratio (from .75 to .82), which is 28 percent (.07/.25) of the original wage gap, may be taken as a rough indicator of the relative importance of the segregation of females into low wage establishments. Since equal pay legislation does not allow comparisons across establishments then this 28 percent of the wage gap could not be closed by equal pay laws. This suggests that even if equal pay laws are completely effective within their jurisdiction (i.e. within establishments), there will still be a male-female wage gap between narrowly-defined occupations -- albeit the gap may be only about one-quarter of its original size -- reflecting the segmentation of women into low wage establishments.

EVIDENCE FOR ALL CANADA

The empirical evidence for Ontario, discussed in the previous section, is consistent with evidence based on data for all of Canada. Summarizing any set of empirical studies is at best hazardous given differences in methodologies and data. Such differences are discussed in the larger study and, more importantly, in the original studies themselves. Nevertheless, subject to these qualifications, some generalizations do appear to emerge from the empirical studies.

Table 2 compares various Canadian studies by citing the gross, unadjusted female/male earnings ratio and the ratio after adjustments are made for a variety of wage determining factors as indicated in the Table. Only those studies that enable a computation of both a gross and adjusted earnings differential (as done earlier) are included. The Ontario results, as discussed in the preceding section, are repeated for comparative purposes.

The case studies are particularly interesting because by focusing on a particular establishment, they implicitly control for wage differences that may arise from differences in region, industry and establishment. Since equal pay legislation generally refers to equal pay within the same establishment, then intrafirm wage differences by sex are particularly relevant from a policy perspective. In addition, data for case studies usually are obtained from personnel records which often provide more detailed information on characteristics such as seniority, and which contain information on actual earnings (as opposed to retrospective earnings that respondents give on a survey question). In this sense case studies potentially can provide more precise estimates of pure wage discrimination within establishments, since they enable controlling for a variety of wage determining factors. However, they do not provide estimates of wage discrimination that may reflect segregation into low wage firms, regions or industries, nor do they usually reflect possible discrimination within firms in occupational assignments or promotional opportunities. In essence, one loses information on other possible elements of discrimination. Nevertheless, the more precise estimates of intrafirm pure wage discrimination do provide useful information from a policy perspective.

The studies by Schrank [1977] and Stelcner [1979] for university faculty are particularly informative since they illustrate the importance of differences in rank as a determinant of the earnings gap. Schrank indicates that differences in rank accounts for two-thirds of the average salary gap, and Stelcner indicates that, when rank is held constant, the earnings gap between males and females becomes statistically insignificant. This highlights the observation that differences in promotional opportunities may be more important than wage discrimination at the same job level in explaining the overall male-female earnings gap.

As an alternative to the human capital technique, which attempts to control for wage differences arising from differences in productivity related endowments, Walmsley, Ohtsu, and Verma [1980] utilized job evaluation point scores assigned for such factors as skill, effort, responsibility and work conditions. In essence, they replace human capital variables (the quantity and quality of which are difficult to measure) by a single job evaluation score which encompasses the relevant productivity related factors pertaining to skill, effort, responsibility and work conditions. Their results show that males tended to have slightly better job evaluation scores but that even when their skill, effort, responsibility and work conditions are the same (as measured by job evaluation scores) males tend to receive higher wages.

The results of Kapsalis [1980] are also particularly interesting since they are designed to provide a conservative measure of the

TABLE 2 - FEMALE/MALE EARNINGS RATIO UNADJUSTED FOR VARIOUS PRODUCTIVITY RELATED FACTORS, CANADA

Study	Year and Data	Gross Unadjusted Ratio[a]	Net Adjusted Ratio	Productivity Adjustment Factors
		ONTARIO		
1. Gunderson (1975)	Narrowly-defined occupations same establishment	.82	.93	Human capital via occupation, incentive pay system, union status, industry, region
2. Robb (1978)	1970 Census	.60	.76	Age, marital status, education, training, time worked, occupation, and industry
			.94	As above plus experience
3. Gunderson (1980)	1970 Census	.60	.76	Potential experience, marital status, education, training, language, time worked, occupation, industry, residence
		CASE STUDIES		
4. Schrank (1977)	University faculty 1973/74	.83	.95	Experience, seniority, rank, citizenship, faculty, administrative responsibilities, research output
5. Steicner (1979)	University faculty 1976/77	.91	.94	Experience, seniority, department head, having Ph.D.
6. Walmsley, Ohtsu & Verma (1980)	Unnamed organization Saskatchewan, 1980	.80	.87	Skill, effort, responsibility, working conditions (as measured by job evaluation score)
		EARLIER CANADIAN STUDIES		
7. Ostry (1968)	1960 Census	.59	.81	Age, education, occupation
8. Robson & Lapointe (1971)	University faculty	.80	.90	Age, rank, field, degree, university size and region
9. Holmes (1976)	1967 Survey	.49	.56	Age, martial status, education, immigration status, time worked, occupation, residence and region
		RECENT CANADIAN STUDIES		
10. Gunderson (1979)	1971 Census	.60	.77	Potential experience, marital status, education, training, language, time worked, occupation, industry, residence, region
11. Shapiro & Steicner (1980)	1971 Census			Age, marital status, education, training, language,
	Canada public	.65	.83	time worked, occupation, city size and region
	Canada private	.57	.72	
	Quebec public	.66	.87	
	Quebec private	.56	.74	
12. Steicner & Shapiro (1980)	1971 Census			As in Shapiro and Steicner (1980)
	All males and females	.60	.82	time worked, occupation, city size and region
	Single and over 30	.60	.82	
13. Kapsalis (1980)	1975 Survey of Consumer Finance	.61	.87	Age, residence, job duration, occupation, region

Source: Based on calculating performed in the text from data given in the original articles. Some studies such as Boyd and Humphreys (1979) and Kuch and Haessel (1979) were not included since they did not enable time calculation of unadjusted and adjusted ratios.

Note: (a) For comparability purposes the ratio for full-time workers was used.

extent of wage discrimination. This is done by comparing only unattached individuals (to minimize the effect of marital status) and by comparing the minimum expected male earnings with the maximum expected female earnings. The productivity adjusted earnings ratio of .87 suggests that wage discrimination appears to prevail even under very conservative assumptions concerning its magnitude; however, the remaining gap is much smaller than the average overall gap.

In comparing the results of the different studies in Table 2, one should keep in mind that, although the gross and adjusted ratio columns do reflect the ratios before and after adjustments are made for productivity related factors, the different studies usually involved different adjustments factors, reflecting data availability. More importantly, the gross wages across the different studies already encompass different adjustments that have gone on in the derivation of the gross wage. For example, the gross ratio of .91 for Stelcner, being based on earnings in the same occupation and in the same establishment, already controls for more of the wage determining factors than are controlled for in the adjusted ratios of many of the other studies. Thus the unadjusted column simply refers to the ratio prior to adjustments that can be made given the data in that study, and adjusted simply refers to the ratio after adjustments for productivity related factors, again given the particular data of each study.

The gross unadjusted ratio of female/male earnings for full-year full-time workers tend to be around .60 when comparisons are made across occupations and establishments (e.g. Robb [1978]; Gunderson [1980], [1979]; Ostry [1968]; Shapiro and Stelcner [1980]; and Kapsalis [1980]). This is the figure that tends to be most often cited as reflecting, on average, what females earn relative to males in the labour market. It may reflect wage discrimination as well as occupational and industrial segregation in the labour market, and it may reflect different endowments of productivity related characteristics -- differences that also may reflect discrimination both in the labour market and prior to entering the labour market. As the gross, unadjusted ratio of .41 in Holmes [1976] illustrates, over their lifetime women can expect to earn even less than 60 percent of male earnings, reflecting their different expected participation in the labour market.

When rough adjustments are made for differences in some measured productivity related characteristics the net adjusted ratio tends to rise to within the range of .75 to .85. That is, females who are similar to males in terms of measured endowments such as education, training, potential experience, language, marital status, time worked, occupation and industry, tend to earn roughly 75 to 85 percent of what comparable males earn. The gap implied by this adjusted ratio may be thought to understate the total degree of discrimination because it controls for, and therefore does not reflect, potential discrimination in the acquisition of the productivity related characteristics. On the other hand, this gap may overstate the degree of labour market discrimination because it does not usually control for unmeasured variables such as actual work experience or the type of education, nor does it control for differences in the distribution of males and females within the broad occupation groups used in the empirical work. (Again these differences themselves may also reflect discrimination, hence raising the issue of the extent to which they

should be controlled for in arriving at an earnings gap to reflect discrimination.)

Using more narrowly-defined occupations within the same establishment (the reference group that is usually utilized in equal pay for equal work legislation), the adjusted ratio tends to be in the range of .90 to .95, (e.g. Gunderson [1975], and the case studies of Schrank [1977], Stelchner [1979] and Walmsley, Ohtsu and Verma [1980]). The remaining gap of 5 to 10 percent probably is a fairly accurate measure of the extent of narrowly-defined wage discrimination within the same establishment and occupation.

Many would argue that a figure of 5 to 10 percent is a gross underestimate of the extent of wage discrimination, even in its narrower form within the same establishment and narrowly-defined occupations. Nevertheless, such a figure is credible for a number of reasons. First, it is only one component of total discrimination, both within and outside the labour market, that affects the earnings gap. Also, as noted earlier, it is probably smaller than occupational segregation which is the other main component of labour market discrimination. Furthermore, estimates of wage discrimination that are much larger must confront the anomaly of their being consistent with competitive forces in the labour market. In other words, if a large discriminatory wage gap prevailed then profit maximizing firms would hire mainly females, because by definition they would be cheaper relative to their productivity, and this process would bid up female wages until the discriminatory gap dissipated. Certainly, there are non-competitive elements that can work against this process and not all firms behave in this fashion (although there is the question of the long-run competitive position of those that do not). Nevertheless, surely some firms will hire according to nondiscriminatory employment criteria and the pressure to do so, and the profits to be made, would be greater given a larger discriminatory wage differential. Accordingly, a discriminatory wage differential of 5 to 10 percent is more believable as prevailing in a reasonably competitive environment. Moreover, a gap of 5 to 10 percent is not inconsequential, especially when it exists over a long period of time and is only one component of total discrimination.

Although a 5 to 10 percent gap is not inconsequential, it does indicate the rather limited scope for equal pay for equal work legislation in closing the earnings gap because it is traditionally confined to comparisons within the same establishment and occupation. Also, the relatively small magnitude of wage discrimination highlights the larger relative importance of occupational segregation as a determinant of the overall earnings differential, which points to the larger potential scope for fair employment legislation. It may also suggest a larger scope for affirmative action and equal pay for work of equal <u>value</u> legislation, since the former can reduce occupational segregation and the latter enables wage comparisons across more disparate occupational groups.

Empirical studies that enable regional comparisons indicate that the male-female earnings gap in Ontario was about average relative to the gap in other provinces, when other wage determining factors are held constant (Gunderson [1979]; Kapsalis [1980]). The only other regional comparison that can be made from the existing evidence is

with Quebec, where Stelcner and Shapiro [1980] find the overall portion of the wage gap attributable to discrimination to be smaller than in the rest of Canada.

The empirical results for Canada also indicate that the earnings gap is considerably smaller in the public as opposed to private sector, and that the gap in Ontario is roughly of the same magnitude as the average gap in the rest of Canada. Comparisons with other countries are made in the next section.

EVIDENCE IN OTHER COUNTRIES

As indicated previously, comparisons within Canada are made difficult because of the different data sources and methodologies. These problems are compounded when one makes international comparisons, especially beyond North America. Nevertheless, some comparisons can be made and they are instructive, not only because of the additional evidence they provide, but because they also shed light on some of the current methodological debates and on the impact of alternative socio-economic-political environments.

United States Evidence

Lloyd and Neimi [1979, pp.232-238] provide an extensive tabular summary of unadjusted and adjusted earnings ratios from approximately twenty-one United States studies similar to those provided earlier for Canada. The comparison reveals considerable variation in the unadjusted and adjusted ratios; nevertheless, many of the differences are readily explained by differences in the nature of the data used. In general, similar patterns as those found in the Canadian data prevail. Unadjusted earnings ratios of approximately .60 prevailed, based on aggregate data. When various productivity related adjustments were made the ratios fell within a range of .70 - .90, with the higher ratios reflecting more precise adjustments for such factors as absenteeism, turnover, narrowly-defined occupation differences, and work experience in its various dimensions: general labour market experience, tenure in the actual job, and continuity of experience. As with the Canadian data, the adjusted ratios in narrowly-defined specific occupations, especially within the same establishment, were quite high, averaging .94 in the five studies reported.

Other U.S. studies, not referred to in Lloyd and Neimi, confirm the existence of only a small adjusted male-female wage gap within the same narrowly-defined occupation within the same establishment. The data presented in McNulty [1967] enables the calculation of an unadjusted ratio of .84 within narrowly-defined occupations and .97 within narrowly-defined occupations and within the same establishment. A similar calculation from data given in Buckley [1971] enables the calculation of an unadjusted ratio of .85 and an adjusted ratio of .98 within the same narrowly-defined occupation within the same establishment.[2] This again highlights the limited potential for equal pay legislation as it is usually interpreted as applying within the same establishment and occupation.

Recent U.S. empirical evidence substantiates further the importance of occupational segregation, especially within narrowly-defined occupations. Brown, Moon and Zoloth [1980], for example, explicitly incorporate a model of occupational attainment into their analyses of wage differentials. They find that [p. 3]: "only 14 to 17 percent of the total wage differential is attributable to differences in endowments and that more of the unexplained differences results from within -- rather than across -- broad occupational groups."

Based on data from three U.S. companies that included measures of seniority as well as other productivity factors, Cassel, Director and Doctors [1975] found that discrimination at the hiring stage was more prevalent than promotion discrimination which in turn was more important than wage discrimination at a given job level. In fact their empirical results indicate that after controlling for grade discrimination at the hiring stage, wage discrimination at a given job level was reduced in all cases and disappeared in many. In essence, occupational segregation at the hiring stage and throughout the promotions stages was a more important determinant of the male-female earnings differential than was wage discrimination at a given job level.

U.S. evidence parallels findings in Canadian studies in showing that the discriminatory wage gap tends to be larger in the private sector than the public sector [Smith (1977); Long (1976) and Johnson and Stafford (1974)].

A thrust of a number of recent U.S. studies has been to try to adjust the earnings gap for a variety of factors that traditionally have been difficult to measure. Mincer and Polachek [1978] try to control for various dimensions of experience including labour market experience, tenure at the existing job and the continuity of that experience, and they estimate a productivity adjusted ratio of .83. Landes [1977] estimates that sex differences in training and turnover explain at least two-thirds of the relative wage differential between men and women within occupations. Frank [1978] provides empirical evidence that controls for female immobility that results from their being tied to their husband's area of employment. After controlling for this immobility and such factors as education, experience and location, a residual of 8 per cent remains, reflecting labour market discrimination as well as possible unobservable characteristics. DeTray and Greenberg [1977] suggest that much of the wage gap attributed to sex discrimination may be the result of omitted variables, in particular those relating to the quality of some human capital characteristics. They illustrate their concern through empirical evidence based on a sample of San Diego school teachers which indicates that when differences in education are controlled for by rough categories of education, a discriminatory wage gap prevails. However, when more precise detailed measures of the education variable are included, the discriminatory wage component almost disappears. They suggest that their results may be more generalizable and that much of the wage differential often attributed to discrimination may be due to such omitted variables as training, overtime, and seniority.

While many studies clearly demonstrate that much of the wage gap traditionally labeled as discrimination can be explained by

differences in such factors as experience, seniority, continuity of experience, turnover and job level, there is not a consensus about the importance of these factors. Also, there remains the question of the extent to which differences in these factors arise because of discrimination. Sawhill [1973], for example, finds that some rough adjustments for experience do not matter much. Corcoran and Duncan [1979, p. 5] also state: "No study measures the frequency, duration, and intermittance of work experience for both men and women. Perhaps more importantly, no studies have direct measures of on-the-job training, absenteeism, or self-imposed restrictions on job choice." They then utilize data which provides information on two variables usually omitted from empirical analysis -- work history and labour force attachment -- and conclude, somewhat surprisingly, that [p. 15] "differences in work continuity and labour force attachment did not lead to appreciable differences in pay". They conclude that [p.16] "a very large part of wage differences cannot be explained by our long list of productivity factors."

Clearly there is not unanimous agreement on the relative importance of the various productivity adjustment factors. Neverthless, the general agreement seems to be that the greater the refinement for productivity related factors, the smaller becomes the extent of the gap attributable to narrowly-defined wage discrimination, especially within the same narrowly-defined occupation and establishment. Occupational segregation appears to be much more important than wage discrimination.

Evidence from Outside North America

Evidence from countries outside North America also tend to confirm many of the patterns found in North America.[3] Subject to the appropriate qualifications that should be made with respect to such international comparisons, the comparative results suggest that discrimination, including wage discrimination, is a common problem across various socio-economic-political environments. In most circumstances the unadjusted earnings gap is substantial, and comparable to that found in North America. Within narrowly-defined occupations and comparable jobs the gap is reduced considerably, and it is reduced further when allowances are made for differences in productivity related factors. Nevertheless, a productivity adjusted wage gap still seems to prevail suggesting the existence of some narrowly-defined wage discrimination. The fact that this is small relative to the overall earnings gap, however, suggests that occupational and industrial segregation is potentially more important than narrowly-defined wage discrimination. The important impact of differences in such factors as seniority, turnover and experience also suggests that differences in family and household responsibilities are also important. The extent to which such differences themselves reflect discrimination or choice remains an open and controversial issue.

The international comparisons also suggest -- although this is an impressionistic conclusion that may be disputed by others -- that countries with a more egalitarian social philosophy can set in motionthe pressures, legislative and otherwise, that can reduce the male-female earnings gap. This is not to say that legislation is always the answer. Indeed the persistence of wage discrimination in

the face of equal pay legislation which is only one part of total discrimination, and the sanctioning -- indeed the formalizing -- of such a wage gap through the Australian labour courts suggest that legislation is not a complete solution.

SUMMARY, CONCLUDING OBSERVATIONS, AND SOME POLICY IMPLICATIONS

Summary Highlights

Subject to the numerous qualifications referred to in the text, and in the larger study itself, the following generalizations emerge.

(1) On average, in Ontario and the rest of Canada, the female/male earnings ratio for full-time, full-year workers, unadjusted for differences in productivity related factors, is approximately .60. Adjustments for various productivity related factors such as experience, time worked, education, training, location, and occupation and industry tend to raise the adjusted ratio to approximately .75 - .85. Differences in experience and occupational distribution tend to be the most important determinants of the earnings differential. When productivity adjusted comparisons are made within the same narrowly-defined occupations within the same establishment -- the wage gap that is most relevant for equal pay legislation -- the adjusted ratio tends to be in the range of .90 - .95.

(2) The extent to which differences in the endowment of productivity related factors reflect discrimination or choice remains an open question. Certainly, some differences in such factors as continuous labour force experience, seniority, mobility, type of education, and time worked reflect discrimination within the household as well as in educational institutions prior to entry into the labour market.

(3) The segregation of females into low wage occupations and into low pay jobs within an occupation appears to be a more important determinant of the overall earnings gap than wage discrimination within the same narrowly defined occupation within the same establishment. Perhaps for this reason the limited empirical evidence for Ontario suggests that equal pay legislation has not been able to reduce the earnings gap significantly.

(4) Both the unadjusted and productivity adjusted earnings gap tends to be much smaller in the public than private sector, although a productivity adjusted earnings gap still seems to prevail in the public sector.

(5) There appears to be conflicting evidence on the time pattern of the earnings gap, although most -- but not all -- of the evidence suggests that the relative gap is narrowing slightly over time.

(6) The economic return to education for females appears higher than for males at advanced levels of education but not for basic, early levels of education.

(7) The productivity adjusted earnings gap tends to be smaller when job evaluation schemes are utilized to assess productivity. Nevertheless, the results from different job evaluation schemes tend to vary considerably suggesting that they will not give a unique "scientific" answer to assess work of equal value.

(8) The earnings gap tends to be smaller in unionized establishments suggesting that unions could be an effective device to help achieve equal pay. Their overall impact, however, may be greater if a larger proportion of women were unionized and if they exerted more influence in the union movement by holding senior offices.

(9) Internationally, there is considerable similarity in the magnitude of the earnings gap and in some of its determinants. Nevertheless, the gap does seem to be smaller in those countries that pursue activist policies to reduce the gap and where social attitudes appear to be more egalitarian. Conversely, in tradition dominated societies the gap tends to be larger, although even in such societies it can narrow in response to growth pressures in the demand for female labour.

Concluding Observations and Policy Implications

The summary highlights and the discussion in the text strongly suggest that wage discrimination, narrowly-defined as unequal pay for the same productivity related characteristics, is unlikely to be a large component of the overall male-female earnings differential. Rather, differences in productivity related characteristics and occupational segregation are the more important determinants.

This finding should not be surprising given the theoretical consideration that profit maximizing employers would not forego the profits to be had by hiring females if their wages were considerably below their productivity. The importance of productivity differences and occupational segregation is further substantiated by the fact that the male-female earnings gap tends to be small for young workers for whom productivity differences (reflecting experience) are likely to be small.

From a policy perspective, the importance of differences in productivity related characteristics and occupational segregation suggests that attention should be focussed on discrimination in the acquisition of productivity related characteristics and on discrimination that creates occupational segregation. Equal employment opportunity and affirmative action programs are obvious possibilities to reduce occupational segregation. Further, by increasing the demand for females, these programs have the potential for increasing both the wages and employability of females. In contrast, equal pay legislation runs the risk of reducing female employment opportunities.

Much of the potential discrimination in productivity related factors and in the occupational attainment of females can emanate from outside the labour market. Given the importance of the various facets of experience -- general labour market experience, the continuity ofthat experience, and company specific seniority -- this variable merits special policy consideration. Many of the differences in

experience emanate from different household responsibilities between males and females. While public policy may not have a direct impact on the division of household responsibilities, it can certainly have an indirect impact. Policies to expand and facilitate the labour market opportunities of females can change their expected role -- some would say bargaining power -- within the household and this in turn will affect their labour market behaviour.

Throughout the paper equal pay for equal work legislation was not portrayed as a powerful and important policy option. Given the small magnitude of narrowly-defined wage discrimination, its potential is limited. In addition, to the extent that it is successful, it runs the risk of reducing employment opportunities for females by raising their relative cost.

This rather negative portrayal of equal pay legislation, however, should be qualified. It may have a substantial indirect impact by changing the attitudes of employers and employees, and it may even alter the relative position of the parties within households. It appears to have had an impact on reducing the earnings gaps in the U.K., although its effect is difficult to disentangle from the incomes policy. Given these qualifications, perhaps the most balanced statement that can be made is that equal pay cannot be relied upon as the main policy option.

The results of this study shed some light on the efficacy of the controversial legislation of equal pay for work of equal value. First, by broadening the scope of comparison across occupations it opens up the possibility of reducing the discrimination that results from occupational segregation, which was shown to be larger than the narrowly-defined wage discrimination that is the purview of legislation on equal pay for equal work. Second, to the extent that it is accompanied by job evaluation techniques to assess equal value it may reduce the gap indirectly, because the gap tends to be smaller in jobs with job evaluation schemes. On the other hand, job evaluation schemes do not provide precise estimates of equal value. In addition, given the importance of differences in productivity related factors -- notably the different facets of experience -- legislating equal pay for work of equal value cannot directly reduce discrimination in the acquisition of these factors. Equal value legislation, like any legislative intervention in the labour market, will also have its obvious costs. In summary, its potential is clearly broader than conventional equal pay legislation, but it will have its own associated problems and it cannot hope to completely close the discriminatory gap.

In that vein, legislating equal pay for work of equal value, like affirmative action and policies designed to improve the labour market option for females, can be regarded as additional policies in the "arsenal of weapons", along with more conventional policies like equal pay for equal work and equal employment opportunity legislation. Theevidence suggests that an "arsenal of weapons" approach would yield benefits in terms of reducing the earnings gap attributable to the various forms of discrimination. The overall efficacy of such an approach, however, depends on its costs as well as benefits.

FOOTNOTES

1. Since the data is almost the same as that utilized in this study, a similar unadjusted earnings ratio of approximately .60 probably prevails. According to Robb the wage discrimination residual accounts for approximately 59 percent of the remaining gap when experience is not controlled for and 15 percent when it is controlled for (as given in Table 1 of this study). Therefore, productivity endowment differences (including occupation and industry differences) account for 41 percent of the gap when experience is not controlled for and 85 percent when it is controlled for. In percentage points, the earnings gap is .40 of which .164 (.i.e. .41 x .40) can be attributed to endowment differences when experience is controlled for. Adding these endowment differences to the unadjusted ratio of .60 yields productivity adjusted earnings ratios of .76 when experience is not controlled for and .94 when experience is controlled for.

2. See the larger report, Gunderson (1980, p. 6.19) for details of these calculations.

3. The larger report, of which this is a summary, reviews evidence from the United Kingdom, continental Europe, Scandinavia, Australia and Japan; a recent review by Agarwal (forthcoming) also includes some unpublished studies from the United Kingdom.

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